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An Experimental Diet in Hypercholesterolemia

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and CLAUDE ALLARD, Ph.D.^{1*}

INCREASED blood cholesterol level and lowered percentage of serum alpha-lipoproteins appear to be prevalent in human atherosclerosis (1, 2, 3). It is known that a restriction of the total calories, of the exogenous cholesterol and of the total lipids were not effective in lowering serum cholesterol level in a persistent manner. This was reviewed recently (4). In 1952, Groën *et al.* (5) and Kinsell *et al.* (6) observed a definite hypocholesterolemic action of vegetable oils. Since then, the blood cholesterol lowering effect of vegetable oils has been ascribed to their polyunsaturated fatty acid content (7, 8, 9, 10). On the other hand, the long-term effect of a polyunsaturated fatty acid diet on serum lipoproteins has not been fully investigated. Gofman and his group (11) using the ultracentrifuge, showed that the low-density blood-lipoprotein classes, which were usually elevated in atherosclerosis, could be influenced by dietary means. More recently, in a short term experiment, Horlick (12), using paper electrophoretic methods, observed an increase in the percentage of the alpha lipoproteins in subjects submitted to a diet rich in polyunsaturated fatty acids.

The purpose of this work was to study, over long periods of time, the effects of a diet high in polyunsaturated and low in saturated fatty acids on blood cholesterol and lipoproteins. The effect on the blood cholesterol of adding ham to the diet was also investigated.

Subjects

Two groups of non-familial hypercholesterolemic subjects, living a normal life, were selected for this study. The first group, nine men and one woman, and

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the second, five men, were submitted to the diet for 30 and 18 months respectively. At the time the diet was taught, their ages ranged from 34 to 57 years. Of these 15 cases, 13 had had a myocardial infarction and/or were suffering from angina pectoris; the other two were asymptomatic.

Composition of the Diet

In our experimental diet, most of the polyunsaturated fatty acids were supplied by corn oil substituted for animal and all hydrogenated vegetable fats. The recommended daily dose was about three ounces to be taken in separate portions before meals and/or used in cooking processes. The daily use of marine fishes and walnuts was highly recommended. Poultry and meats were permitted provided visible fat had been removed.

In order to restrict the saturated fatty acids to a minimum, egg yolks, whole milk and dairy fats were prohibited. Although of vegetable origin, cocoa, chocolate, hydrogenated vegetable fats such as margarine, spreads, and shortenings were not allowed. The diet is detailed in Table I.

TABLE I—DIET

Type of Food	Foods Included	Foods Excluded
<i>Oils and Fats</i>	Corn oil: minimum intake of 1/3 cup daily to be taken in separate portions before each meal and/or used in food preparations; marine fish oils.	Any other vegetable oil; products of hydrogenation e.g., margarine, spreads, shortenings; animal fats e.g., butter, cream and its by-products; suet, lard.
<i>Mayonnaise and Dressings</i>	Prepared with corn oil using egg white instead of egg yolks or whole eggs.	Any other mayonnaise and dressings; commercially prepared sauces of unknown composition.
<i>Fish and Shellfish</i>	Fresh, frozen, canned marine fish and shellfish: at least 3 times a week, steamed, poached, boiled, baked, broiled, pan-fried or deep-fat fried in corn oil.	Fresh-water fish.
<i>Meat and Poultry</i>	(Pork, ham, bacon)*, turkey, chicken, lamb, beef and veal; boiled, roasted, broiled, pan-fried and deep-fat fried in corn oil.	Visible fat on meat; delicatessen.
<i>Egg</i>	Egg white.	Egg yolk.
<i>Cheese</i>	None.	All.
<i>Beverages</i>	Skim milk, buttermilk, coffee, tea, cereal beverages, carbonated beverages, moderate use of alcohol.	Whole milk, cocoa, chocolate.
<i>Soups</i>	Fat-free meat broth, consommé, vegetable broth, milk soup made with skim milk.	Soups containing meat fat, cream soups.
<i>Cereals</i>	All, with emphasis on whole grain cereals.	None.
<i>Breads and Breadstuffs</i>	Preferably whole grain bread.	Any made with egg yolks.
<i>Alimentary Pastes</i>	All except those prepared with egg yolks.	Egg noodles.

TABLE I—DIET (continued)

Potatoes	Boiled, baked, mashed or scalloped, with skim milk and corn oil, pan-fried or deep-fat fried in corn oil.	Potato chips, frills, etc.
Vegetables and Vegetable Juices	All; daily consumption of salads with corn oil.	None.
Fruits and Fruit Juices	All.	None.
Desserts	Flavored and fruit gelatin desserts, water ices, simple cookies, angel food cake, plain pastry prepared with corn oil, simple desserts made without egg yolks using skim milk.	Any other dessert prepared with butter, shortening, whole milk, cream, egg yolks e.g., pancakes, waffles, doughnuts, cakes, cookies, puddings, pastries and pies, custards, ice cream.
Sweets	Sugar, molasses, corn syrup, maple syrup, honey, jelly, jam, marmalade, hard candy, gum drops, marshmallow, fondants.	Candies made with cream, butter, shortening, whole milk, egg yolks or chocolate.
Nuts	English walnuts in the shell.	Any other.
Miscellaneous	Salt, spices and seasonings, vinegar, olives, pickles.	Peanut butter, coconut.

*Pork, ham and bacon were added to the diet after it was observed that ham did not affect the blood cholesterol (see text).

The analysis of the weekly menus, as returned to the dietitian, showed that the percentage of total calories supplied by carbohydrates varied from 35 to 45%, by protein from 12 to 16% and by lipids from 42 to 52% (Table II). The calculated linoleic to saturated fatty acids ratio ranged from 1.1 to 1.5 (Table V).

TABLE II—APPROXIMATE COMPOSITION* OF THE DIET FOLLOWED BY THE PATIENTS (1,500 to 2,700 calories)

Nutrient	% of total Calories
Carbohydrates	35-45
Proteins	12-16
Lipids	42-52
Saturated fatty acids	8-12
Oleic acid	19-26
Linoleic acid	8-18

*Values compiled from Table of Food Values Recommended for Use in Canada (13), Hilditch (14), Hardinge and Crooks (15), U.S.D.A. Home Economics Research Report No. 7 (16).

METHODS

During the pre-diet control period, which lasted from one to three months, blood samples were taken for determinations of the total-serum cholesterol levels according to the method of Schoenheimer and Sperry (17). The lipoproteins were determined by a paper electrophoretic technic recently described (3).

The diet was presented to the assembled patients and the person responsible for preparing their meals in order that everyone receive the proper instruction.

TABLE III—SERUM TOTAL CHOLESTEROL (MG./100 ML.), ALPHA LIPOPROTEINS (%), AND MEAN BODY WEIGHTS (LBS.) OF PATIENTS UNDER STUDY

	Groups*	Before Diet (months)		During Diet (months)				
		0-3	1-6	7-12	13-18	19-24	25-30	
Cholesterol \pm S.D.	I	315 \pm 42 (31)**	244 \pm 58 (91)	—	223 \pm 39 (35)	196 \pm 46 (43)	202 \pm 34 (45)	
	II	326 \pm 51 (23)	235 \pm 31 (54)	218 \pm 39 (26)	222 \pm 34 (20)	—	—	
"Percent Alpha" \pm S.D.	I	13.9 \pm 4.8 (40)	15.5 \pm 6.0 (82)	—	15.5 \pm 4.0 (35)	17.0 \pm 5.4 (34)	—	
	II	12.2 \pm 2.6 (14)	16.4 \pm 3.3 (43)	18.4 \pm 3.9 (18)	—	—	—	
Body Weights \pm S.D.	I	156 \pm 28	156 \pm 28	159 \pm 32	157 \pm 31	158 \pm 31	153 \pm 29	
	II	163 \pm 18	161 \pm 18	161 \pm 15	159 \pm 13	—	—	

*Group I; 10 patients; Group II; 5 patients.

**Number in parentheses = number of determinations.

The physician opened the sessions by giving information on hypercholesterolemia, its possible association with atherosclerosis, and the degree of saturation of the different fats and oils. The dietitian then explained the diet and supplied appropriate recipes. Patients were assigned weekly appointments during the first month, two during the second month and one a month thereafter. Each appointment included an analysis of serum lipids and a routine physical examination. At the same time, the weekly menus were checked by the dietitian and discussed with each patient.

After at least one year of dietary treatment, eight of the fifteen subjects were requested to add ham to their diet as a partial substitute for other meats. They ate ham from three to ten times a week. The blood cholesterol-levels prior to and after the introduction of ham were compared.

RESULTS

Table III presents the mean changes in total cholesterol-levels and in the percentage of alpha lipoproteins or "percent alpha". In both groups, there was a significant drop ($p < 0.001$ and < 0.005 respectively) in the mean serum cholesterol-levels during the first six months. Thereafter the total cholesterol remained low. The mean "percent alpha" in the first group rose, although not significantly ($p = 0.25$), during the first six months; on the other hand, during the same interval, the second group showed a significant increase ($p = 0.003$). Subsequently, the "percent alpha" values in both groups remained higher than those of the pre-treatment period. The mean body weight did not vary significantly (Table III).

Results given in Table III were summarized in Fig. 1. A decrease in the

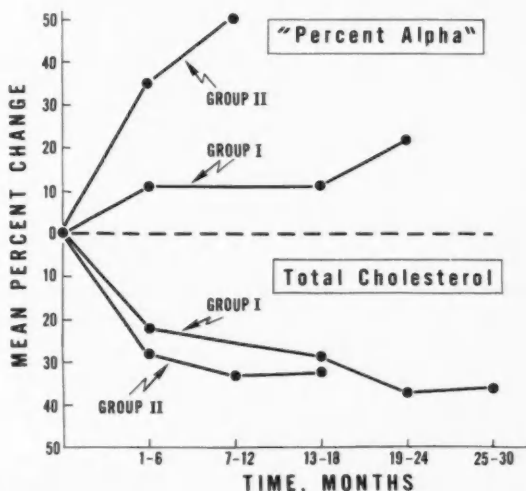


FIGURE 1: Mean percent change in the "percent alpha" and total cholesterol of the serum of two groups of subjects submitted to the experimental diet during 18 and 30 months respectively. The mean percent change was calculated from the values given in Table III taking the pre-treatment values as equal to 100 (see text for description of subjects).

mean blood cholesterol level of 22.5% and 27.7% and an increase in the mean "percent alpha" of 11.5% and 34.4% were observed respectively in each group during the first six months.

Table IV shows that the mean blood total cholesterol of the eight subjects allowed to eat ham remained essentially identical during the five months following the partial substitution of ham for other meats.

TABLE IV—BLOOD CHOLESTEROL-LEVELS (MG/100 ML) OF PATIENTS UNDER DIET PRIOR TO AND FOLLOWING THE ADDITION OF HAM

Subjects	Diet without Ham						Diet with Ham					
	Months						Months					
	1	2	3	4	5	Mean	1	2	3	4	5	Mean
1	219	275	225	—	206	231	—	204	172	—	—	188
2	201	—	280	—	191	224	228	150	162	175	163	176
3	246	—	143	210	245	211	185	194	220	172	232	201
4	241	191	225	261	173	218	213	158	—	227	240	210
5	175	—	177	—	194	182	—	221	204	220	—	215
6	150	192	146	146	158	158	156	139	197	162	162	163
7	131	—	167	—	136	145	168	143	174	166	—	163
8	210	181	267	—	219	219	245	229	—	232	—	235
MEAN:	197	210	204	206	190	197	199	179	188	193	199	190

DISCUSSION

Most of the clinical investigations carried out on the hypocholesterolemic effect of polyunsaturated fatty acids were conducted on subjects of a metabolic ward who were fed a liquid formula diet. Malmros and Wigand (18) and Brown and Page (19) hospitalized their patients and submitted them to a diet in which specially prepared dairy products such as milk, butter, cheese and ice cream were supplied. Instructions were given so that the same diet could be followed at home. The subjects studied by Jolliffe and his group (20) were not restricted in their activities while being submitted to a prudent diet in which all foods recommended were available to the consumer. In our study, the conditions were identical to those of Jolliffe but the diet recommended was more restrictive. Our results showed that the diet produced a sustained drop of the total-serum cholesterol-levels over as long a period as 30 months.

Recently Horlick (12) reported that during a two-week period, the percentage of alpha lipoproteins was raised in subjects submitted to an artificially prepared diet in which the lipids (40% of total calories) were supplied by corn oil. Our work extended that of Horlick by showing that a non-artificially prepared diet could maintain such an increase in the "percent alpha" for at least two years. It is actually difficult to explain the different response of the "percent alpha" in group I as compared to group II (Table III).

A decrease in blood cholesterol-levels can sometimes be ascribed to a loss of body weight (19). In our study, the average body weight of each group was essentially constant during the experimental period (Table III).

There may also be a possibility that psychological factors are responsible in part for reducing the blood cholesterol-level of patients under dietary treatment. To verify this point, two groups of coronary patients were investigated during

three months. The control group, composed of four male subjects with a mean age of 49, was under close medical supervision by the same staff but was not submitted to any hypocholesterolemic treatment. The treated group composed of four male patients with a mean age of 46 was submitted to the diet described previously. Fig. 2 illustrates that the blood cholesterol-level did not change in the control group whereas it decreased in the treated group. The results demonstrated that medical supervision in itself was not responsible for the hypocholesterolemic effect of the dietary treatment.

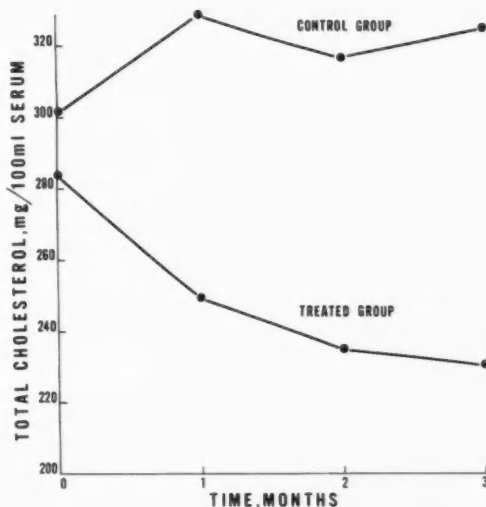


FIGURE 2. Changes in total serum cholesterol of a group of patients on the experimental diet for three months as compared to a control group submitted to the same medical supervision but without dietary treatment (see text for description of patients).

It seemed of interest to compare the proportions of some of the fatty acids of our diet to that of the average American diet. As shown in Table V, the most

TABLE V—PERCENTAGES OF TOTAL CALORIES SUPPLIED BY DAILY FAT INTAKE IN THE AVERAGE AMERICAN AND IN THE EXPERIMENTAL DIET

Nutrient	Diets	
	I*	II**
Percentages		
Total Lipids	43.6	42-52
Saturated fatty acids	18.3	8-12
Oleic acid	18.6	19-26
Linoleic acid	4.5	8-18
L/S ratio†	0.24	1.1-1.5

*Average Daily Fat Use per Person at Home, U.S. 1955 (21).

**Experimental diet.

†L: percentage of linoleic acid; S: percentage of saturated fatty acids.

evident differences between the two diets were in the percentages of saturated and linoleic acids. This was better illustrated when the ratio of linoleic to saturated fatty acids (L/S) was calculated. In fact, the L/S ratio of our diet was four times greater than that of the average American diet. The higher L/S ratio of pork, which is 0.23 as compared to 0.04 for beef, veal, and lamb (17), justified the liberal substitution of ham for other meats in the diet.

It should be pointed out that the present diet was investigated with non-familial hypercholesterolemic subjects only. From previous experiments, the authors noted that in similar conditions some familial hypercholesterolemic xanthomatous patients seemed to respond differently (22).

CONCLUSIONS

The results indicated that a diet high in polyunsaturated and low in saturated fatty acids reduced the total serum cholesterol and tended to induce an increase in the percentage of alpha lipoproteins in non-familial hypercholesterolemic subjects.

The body weight was not influenced.

The results indicated also that ham could be substituted for other meats in the diet without affecting the blood cholesterol.

Sufficiently motivated persons could adhere to this diet for relatively long periods. It would not interfere with their regular occupations, regardless of the few difficulties of adaptation at the beginning.

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The statistical analysis of the data was carried out by Dr. Jacques St-Pierre, Director, Centre of Statistics and Calculus, Department of Mathematics, University of Montreal.

RÉSUMÉ

Deux groupes de sujets hypercholestérolémiques non-familiaux ont été soumis à une diète riche en acides gras non-saturés et pauvre en acides gras saturés; le premier groupe pendant trente mois, le deuxième pendant dix-huit mois. Cette étude a démontré que le cholestérol sérique fut abaissé et le pourcentage des lipoprotéines sériques augmenté. Le poids n'a pas été modifié. Le cholestérol sérique de sujets déjà soumis à la diète n'a pas été affecté par la substitution partielle du jambon aux autres viandes. Les résultats furent discutés. Enfin, l'expérience acquise prouve que la diète peut être suivie pendant de longues périodes de temps en dépit de certaines difficultés d'adaptation.

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For additional information relating to this service please address inquiries to: Dr. E. J. Young, Executive Director, Canadian Public Health Association, 150 College Street, Toronto 5, Ont.

Virus Infections—A World Wide Challenge in Public Health¹

A. J. RHODES,² M.D., F.R.C.P. (Edin.), F.R.S.C.

IT is a great honour to be invited to deliver the Second Donald Fraser Memorial Lecture. This lecture series, inaugurated last year by Dr. G. D. W. Cameron, will pay tribute to the life and work of one of Canada's foremost workers in the field of public health. Dr. Donald Fraser, for almost all of his professional life, was engaged in teaching and research in microbiology and preventive medicine in the University of Toronto. His major contributions included the introduction of diphtheria toxoid, tetanus toxoid, and pertussis vaccine to public health. As a teacher, he influenced many hundreds of undergraduates, and more particularly postgraduates in the D.P.H. and other senior courses. He demonstrated to them that practical public health work must be based on sound academic foundations, one of the most solid of which is microbiology.

It may be claimed today that virus infections represent the most frequent of all microbial infections. By their failure to respond to antibiotics, they stand out in contrast to the bacterial infections. It is as if a fertile soil, freed of bacteria, is available for seeding with viruses. Plentiful crops have grown, including many new species.

Virus infections occur in epidemics, and are of particular interest to public health workers, for all—from time to time—must play some rôle in their diagnosis, prevention, and control.

In this paper I shall discuss chiefly the 160 or so new viruses. As recently as 1939, only about 40 different human viruses were known, and many of these could not be readily studied in the laboratory. Such study as was possible was largely academic, and hardly anywhere was it possible to obtain a routine diagnostic service for virus infections. These infections were diagnosed almost entirely on clinical grounds.

Since 1940 a tremendous change has occurred, for about 160 new viruses have been found, and these can be studied readily in the laboratory.

The Challenge of Numbers

The flood of new viruses is largely explained by improvements in the techniques for isolating viruses. These improvements began in the 1930's and 1940's in studies on yellow fever in South America and Africa. Many new viruses were isolated from humans, monkeys, and mosquitoes by the inoculation of adult mice. Then in 1948, Dalldorf and Sickles found that suckling mice

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were susceptible to infection with the new group of Coxsackie viruses, now about 30 in number.

In 1949, Enders, Weller, and Robbins grew polio virus in tissue culture. They found that the virus destroyed tissue fragments suspended in nutrient in small flasks; the tissue no longer metabolized. When cells were grown in roller tubes in sheets, microscopic evidence of infection in the form of degeneration of the cells was found.

This discovery gave a tremendous impetus to research, and many other viruses were found to produce microscopic changes in tissue cultures. These tissue culture techniques were recognized to be relatively simple, and soon came into widespread use all over the world. This work led to the discovery of scores of "new" viruses, and in this paper I propose to mention briefly all the viruses causing infection of man—new viruses as well as old, about 200 in all.

Fortunately, viruses can be arranged in fourteen major groups, corresponding broadly to bacterial genera. These groups include species with similar properties of size, cultural characteristics, and antigenic structure. This method of classification of viruses by biological properties supersedes the older method of classifying viruses by the system of the body they affect most severely.

In Table I is presented a tabulation of the virus and rickettsial infections of man known in early 1961. The infections are arranged according to the biological grouping of the causal agent.

The Challenge of Virus Infections of Animals

At least 90 different species of viruses and rickettsiae infect animals, such as birds, domestic and wild animals, and rodents. Of these 90 species, about 30 have been proven so far to infect man as well. Many more may also infect man. These zoonoses serve as a threat, because they constitute a reservoir of human infection that is hard to control. The virus and rickettsial zoonoses are included in Table I, but about another 60 infect animals only. These viruses include several tumour-producing viruses of birds and mammals.

Most animal viruses have been insufficiently studied from the viewpoint of classification, and they cannot yet be fitted into the existing scheme of Table I. Undoubtedly, however, many animal viruses closely resemble human viruses, and eventually will be classified in one of the groups shown in Table I.

TABLE I—MAJOR VIRUS AND RICKETTSIAL INFECTIONS OF MAN IN 1961; ARRANGED ACCORDING TO BIOLOGICAL GROUP OF CAUSAL AGENT

Biological Group of Causal Agent	Name of Species of Virus or Rickettsia	Number of Antigenic Types	Major Clinical Features
<i>Herpesvirus</i>	Herpes simplex	1	Herpes
	B virus	1	Myelitis
	Varicella-Zoster	1	Varicella; zoster
	Pseudorabies	1	Pseudorabies
<i>Poxvirus</i>	Variola	1	Smallpox; alastrim
	Vaccinia	1	Vaccinia
	Cowpox	1	Cowpox
	Molluscum	1	Molluscum contagiosum
	Contagious pustular dermatitis	1	Pustular dermatitis
Measles group	Measles	1	Measles
	Rubella	1	German measles

TABLE 1—continued

Biological Group of Causal Agent	Name of Species of Virus or <i>Rickettsia</i>	Number of Antigenic Types	Major Clinical Features
<i>Myxovirus</i>	Influenza viruses A, A prime, Asian	3	Influenza
	Influenza viruses B and C	2	Influenza
	Mumps	1	Mumps
	Newcastle disease	1	Conjunctivitis
	Para-influenza (hemadsorption) viruses types, 1, 2 and 3	3	Respiratory illness
<i>Adenovirus</i>	Adenovirus types 1-24	24	Respiratory and eye infections
<i>Reovirus</i>	Reovirus types 1, 2, and 3	3	Respiratory infection
<i>Cytomegalovirus</i>	Salivary gland virus	1	Cytomegalic inclusion disease
Hepatitis group	Infectious hepatitis	1?	Infectious hepatitis
	Serum hepatitis	1?	Serum hepatitis
<i>Arbovirus</i>			
Group A (Casals)	Equine encephalitis (Eastern, Western, Venezuelan)	3	Encephalitis
	Arboviruses from Africa, Asia, South America	6	Subclinical; fever; dengue-like illness
Group B (Casals)	<i>St. Louis sub-group</i>		
	St. Louis encephalitis	1	Encephalitis
	Japanese B encephalitis	1	Encephalitis
	Murray Valley encephalitis	1	Encephalitis
	West Nile	1	Dengue-like illness
	Ilheus	1	Fever
	<i>Dengue sub-group</i>		
	Dengue types 1-4	4	Dengue
	<i>Yellow fever sub-group</i>		
	Yellow fever	1	Yellow fever
	Uganda S	1	Subclinical
	<i>Russian encephalitis sub-group</i>		
	Spring-summer encephalitis (Europe, U.S.S.R., Malaya)	1	Encephalitis
	Hemorrhagic fever (U.S.S.R.)	1	Hemorrhagic fever
	Diphasic fever (U.S.S.R.)	1	Meningo-encephalitis
	Louping ill (Scotland)	1	Encephalitis
	Powassan (Eastern Canada)	1	Encephalitis
	Kyasanur Forest Disease (India)	1	Hemorrhagic fever
	<i>Other Group B Viruses</i>		
	Ntaya and other viruses from South America and Africa	5	Subclinical; fever; influenza-like illness
Group C	Brazilian viruses	6	Fever
Unassigned to Groups A, B, or C	Rift Valley fever	1	Generalized infection
	Colorado tick fever	1	Tick fever
	Sandfly fever types 1 and 2	2	Sandfly fever
	Viruses from Africa, South America, U.S.A., U.S.S.R.	15	Subclinical; fever; encephalitis; hemorrhagic fever
<i>Rabiesvirus</i>	Rabies	1	Rabies
<i>Enterovirus</i>	Poliovirus types 1, 2, and 3	3	Polio
	Coxsackie A	24	Fever; herpangina
	Coxsackie B	6	Pleurodynia; meningitis; myocarditis
	Echo virus	28	Meningitis; rashes; respiratory illness
Miscellaneous, unclassified	Foot and mouth disease	several	Vesicles
	Warts	1	Warts
	Common cold viruses (Salisbury)	1?	Common cold
	Respiratory syncytial agent	1	Common cold
	Eaton's virus of atypical pneumonia	1	Common cold; atypical pneumonia

TABLE I—continued

Biological Group of Causal Agent	Name of Species of Virus or <i>Rickettsia</i>	Number of Antigenic Types	Major Clinical Features
Basophilic viruses (<i>Chlamydia</i> ; <i>Miyagawanella</i>)	Mengo	1	Fever; encephalitis
	Lymphocytic choriomeningitis	1	Meningitis
	Trachoma	1	Trachoma
	Inclusion conjunctivitis	1	Conjunctivitis; cervicitis
	Psittacosis	1	Psittacosis
	Ornithosis	1	Ornithosis
	Pneumonitis	3	Pneumonia
<i>Rickettsiae</i>	Lymphogranuloma venereum	1	Lymphogranuloma
	Louse borne group		
	<i>Rickettsia prowazekii</i>	1	Epidemic typhus; Brill's disease
	<i>R. quintana</i>	1	Trench fever
	Flea borne group		
	<i>R. typhi</i> (mooseri)	1	Murine typhus
	Mite borne group		
	<i>R. tsutsugamushi</i>	several	Scrub typhus
	Tick borne group		
	<i>R. rickettsii</i>	1	Rocky Mountain spotted fever
	<i>R. conorii</i>	1(?)	Tick typhus fevers of Mediterranean region and Africa
	<i>R. australis</i>	1	N. Queensland typhus
	<i>R. sibiricus</i>	1	Siberian typhus
	Miscellaneous		
	<i>R. akari</i>	1	Rickettsialpox
	<i>Coxiella burnetii</i>	1	Q fever
Totals:	Groups—14 Named Species—101	Antigenic Types 200+	

As an example of how animal and human viruses are related in a single group, we may take the *Myxovirus* or influenza virus group. From Table II it will be seen how human and animal pathogens constitute closely related species of this virus group.

The Challenge of Differential Diagnosis

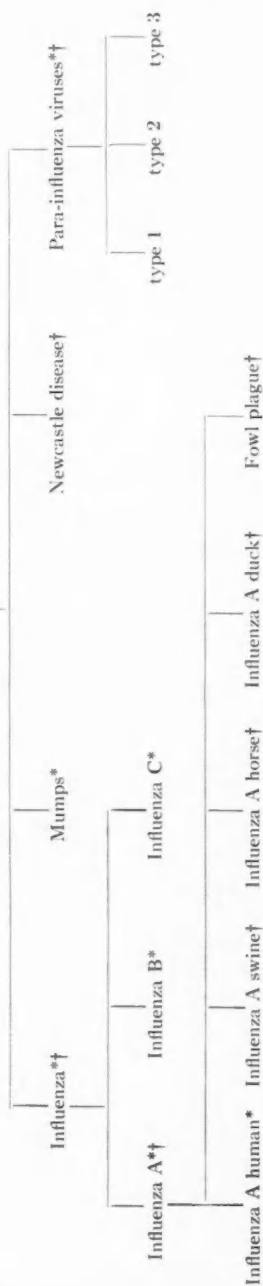
The new viruses shown in Table I mostly cause a wide spectrum of clinical features, ranging from a subclinical infection, to a mild fever, to a more severe and characteristic infection, especially of the respiratory tract, central nervous system, gastro-intestinal tract, skin, and conjunctiva. This tendency to cause a wide range of features is well illustrated in two groups of viruses, the adenoviruses and enteroviruses, as shown in Tables III and IV.

TABLE III—SPECTRUM OF CLINICAL SYNDROMES CAUSED BY ADENOVIRUSES

Syndrome	Types
1. Acute respiratory disease (ARD)	3, 4, 7, 7a, 14
2. Non-bacterial exudative pharyngitis	3, 4, 7
3. Colds and minor respiratory illness	1, 2, 3, 4, 5, 7, 7a, 14
4. Virus pneumonia	1, 2, 3, 4, 7, 7a, 18
5. Pharyngo-conjunctival fever	1, 3, 4, 7, 7a, 14
6. Sporadic conjunctivitis	2, 3, 6, 7, 9
7. Epidemic keratoconjunctivitis (EKC)	8

This phenomenon of a wide spectrum of clinical features can be expressed in another way, for if we study any individual syndrome caused by viruses,

TABLE II—CLASSIFICATION OF THE *Myxovirus* Group¹
Myxovirus Group of Viruses



*Causes natural infection in man.

†Causes natural infection in domestic animals.

¹Modified from Andrews & Worthington, Bull. W.H.O. 1959 20: 435.

many causal agents will be incriminated. For example, common colds, croup, virus pneumonia, meningitis, encephalitis, tropical fevers, rubelliform rashes, and conjunctivitis are all syndromes caused by many viruses.

TABLE IV—SPECTRUM OF CLINICAL SYNDROMES CAUSED BY ENTEROVIRUSES

Syndrome	Enteroviruses Causing Syndrome			
	Poliovirus	Coxsackie A	Coxsackie B	Echovirus
1. Paralysis	1, 2, 3	7, 9	3, 4, 5	2, 4, 6, 9, 11, 16
2. Aseptic meningitis	1, 2, 3	2, 4, 7, 9	1 to 5	2, 3, 4, 5, 6, 7, 9, 11, 12, 14, 16, 18, 20, 21 + unidentified types
3. Summer fevers	1, 2, 3	Several	1 to 5	Several
4. Rubelliform rash	—	2, 4, 9, 16	1, 4, 5	2, 4, 6, 9, 14, 16, 18
5. Myocarditis	1, 2, 3	—	2, 3, 4, 5	—
6. Pericarditis	—	—	2, 3, 4, 5	—
7. Herpangina	—	2, 4, 5, 6, 8, 10	—	—
8. Epidemic myalgia	—	—	1 to 5	—
9. Diarrhea	—	—	—	2, 6, 7, 8, 11, 12, 14, 18, 19, 22, 23
10. Respiratory illness	—	—	—	6, 8, 11, 20, 28

The Long-Term Effects of Virus Infections

We are accustomed to think of viruses as causing acute self-limiting illnesses, but a more fascinating effect of viruses is afforded by study of the action of rubella virus in early pregnancy. It was Gregg, an ophthalmic surgeon who, in Australia in 1940, studied an epidemic of congenital cataracts. He found that these babies were born to mothers who had a history of rubella in the first trimester of their pregnancy. Many babies had other defects of heart, of hearing, and mental defect.

More recently, evidence for a more extensive pathogenic role of rubella virus has been brought forward. Rubella virus is now known to cause abortion, and stillbirth, as well as congenital or birth malformations. The prospective study of Bradford Hill *et al.* showed that if rubella occurred in the first 4 weeks, 50% of infants had birth defects. If rubella occurred in the second month, the risk was 25% that the baby would have a birth defect, and if it occurred in the third month, the risk fell to 17%.

A more extensive study was carried out from 1950 to 1957 under the auspices of the Ministry of Health, the General Register Office, and the Department of Health for Scotland. This forward study made use of data assembled

TABLE V—OUTCOME OF PREGNANCIES COMPLICATED BY RUBELLA*

	Abortions	Stillbirths	Children Dying under 2 years†	Malformations in Live Born Surviving to 2 years
Rubella to 12th week	5.6%	4.5%	6.9%	13%
Rubella after 12th week	0.3%	3.0%	2.7%	1.1%

*Manson, M. M., Logan, W. P. D., and Loy, R. M. 1960. Reports on Public Health and Medical Subjects, No. 101. London, H.M. Stationery Office.

†All deaths in this group occurred in first year of life.

Infant mortality rate for infants born to mothers with rubella in first 12 weeks—76.5 per 1,000 live births.

Infant mortality rate in control group 25.8 per 1,000.

by the Ministry of Health. The group studied the outcome of 600 pregnancies complicated by rubella, 200 of which were in the first trimester. Babies were examined at birth and again at one and two years of age. From Table V, it will be seen that there was an increased incidence of abortions, stillbirths, deaths in the first year of life, and birth defects in those pregnancies where rubella occurred in the first trimester.

This study is of particular interest from a more general point of view, for there have been widespread epidemics of infection in which viremia is a feature. I refer especially to Echo 9 and Coxsackie B5 infections. Furthermore, the widespread administration of live poliovirus viruses calls for an evaluation of the possible teratogenic rôle of these agents. It is known that viremia occurs after feeding, especially with Type 2 virus. However, there have been no reports so far of an increased abortion rate or of birth defects.

Challenge of Control

Virus infections are very prevalent, and epidemics recur at frequent intervals. These cause much loss of time from school or work, and with some there is an appreciable case fatality, e.g., polio, influenza, typhus, smallpox, measles, yellow fever, encephalitis, and rabies. Control is made difficult by several features:

1. Excretion of virus starts shortly before the onset of symptoms, as is well exemplified by the catarrhal phase of measles and rubella.
2. A large amount of virus is present in stool in enterovirus infections and in hepatitis. These viruses are therefore readily spread by close contact.
3. Persons with subclinical infections and abortive infections excrete virus.
4. Many virus infections are zoonoses and therefore very hard to control. Interesting examples of reservoirs of infection hard to control include yellow fever in monkeys, rabies in bats, encephalitis in wild birds, and typhus in rats, rabbits and cattle.
5. Control is also made difficult by one other feature of virus diseases—a tendency to relapse. There is mounting evidence that viruses may persist in the body for a prolonged period after the acute phase, and be awakened by various factors. Herpes simplex is a good example, and zoster is now thought to be a reawakening of varicella, sometimes induced by trauma, drugs, spine disease, or leukemia. Brill's disease (relapsing typhus) is a classic example of recrudescence of an infection in the original host, even 30–40 years after the acute phase.

CONCLUSIONS

Viruses and rickettsial infections constitute a field full of interest to workers in public health. These infections afford a real opportunity for collaboration between virus laboratory workers and health officers. It is likely that these infections will constitute a challenge for an indefinite period.

ACKNOWLEDGEMENT

It is a pleasure to acknowledge the encouragement of the Alumni, School of Hygiene, University of Toronto, to prepare this lecture.

Diphtheria-Foe Gone Underground

A Reminder

H. DILLENBERG,¹ M.D. and R. WOODROW,² M.D., D.P.H.

IN 1920-24 Canada registered 11,000 cases of diphtheria, and in 1935-39, with diphtheria-toxoid already widely distributed, there were 2,715 cases; in 1960 the Dominion Bureau of Statistics listed 53 cases.

This is a proud record, and entirely due to the efforts of the Connaught Laboratories in Toronto, who introduced the toxoid, the federal and provincial health departments, who established the free immunization against diphtheria for any resident in Canada, and the physicians of this country who helped in reaching as many children as possible with this successful immunization procedure. With the decline of cases the carrier rate declined as well, and some areas of Canada seem entirely free of carriers of virulent *C. diphtheriae*. For decades now, many physicians in this country have not seen a clinical case of diphtheria; in some bacteriological laboratories the experience with it may have become hazy.

And yet this enemy has only gone "underground". It seems to lurk in the shadows, ready to strike where it finds a gap in our immunization and it remains an ever-present danger to the public in times of disaster. Civil Defence authorities, therefore, keep us aware that diphtheria must be expected among the first epidemics during a national catastrophe and that a preserved active immunity must be part of our preparedness.

The following examples illustrate this. Diphtheria has struck twice in Saskatchewan in the past twelve months. The first outbreak involved the family of a bankrupt mink rancher at Chitek Lake, 100 miles northwest of Prince Albert. Its first victim was a two-year-old girl, sick at the beginning of June with a severe sore throat for eight days, when she collapsed and had to be brought to hospital. Diphtheria was suspected on clinical grounds and, because antitoxin was not available on the first day, treatment was started with penicillin. On the second day, 120,000 units of antitoxin were given, but on the third day the child died under signs of sudden cardiac arrest. Investigations confirmed a virulent *C. diphtheriae* and also that the mother and four other children in the family had acute faucial diphtheria. The father and a three-month-old baby were carriers of *C. diphtheriae*, but were not clinically ill.

Fourteen further carriers were found in the community, four of them with a history of previous diphtheria, 10-30 years ago. These four had joined the neighbours of the stricken family, who pitied the children for the father's financial ruin and had fed the children, whenever they could call them to their

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homes. One of the four carriers may have been the source of infection. Since all 22 isolated blood strains belonged to type Gravis II, this cannot be clarified. The immunization of the family had been kept up in their better days, until six months ago. But the children and the mother had virtually starved since then. The woman was exhausted and the home was in a dreadful state of neglect. Protein depletion, so often observed as reason for declining active immunity, may have prepared the path for the infection.

All immediate contacts and the carriers of the community were treated with antitoxin and oral penicillin, followed by toxoid immunization. The entire community was immunized with toxoid. Four controls by throat-and-nose swabs were done and two and four weeks later no more carriers were found. The patients recovered uneventfully.

No immunization at all was found in the second outbreak of familial diphtheria, in January 1961, in the home of a Jehovah's Witness at Prince Albert, whose wife, brother-in-law, and three of his five children suffered from an acute faucial diphtheria. The man did not believe in vaccination, but offered no objections when the public health team, after transfer of the patients to hospital, gave antitoxin and oral penicillin to him and the two remaining children in the home. All patients survived, but the mother had some degree of toxic myocarditis and one child had a mild palatal and recurrens-paresis. In this outbreak, diphtheria struck the one family without immunization in a fairly populated area. All search for the source and for other carriers was in vain. The classmates of the sick children were all negative, but on the other hand, they were all well immunized. Again, semi-starvation may have played a rôle, the economic affairs of the family having been strained for many previous months.

The source of the agent will remain unknown. But this was so also in many sporadic cases and small outbreaks of diphtheria one of the writers (H.D.) had observed during seven years as a bacteriologist and epidemiologist in Canada. Many surveys failed to find carriers in the vicinity of cases or small outbreaks. The foe seems to have vanished underground. Alertness to its hidden presence and conscientious immunization are imperative for our defence.

LABORATORY SECTION MEETING

DECEMBER 4-5, 1961

KING EDWARD SHERATON HOTEL

TORONTO, ONTARIO

The Rôle of the Hospital in the Prevention of Disease¹

IRIAL GOGAN,² M.D., D.P.H., M.R.S.H.

IT is difficult for us to appreciate that less than a century has passed since that epic day in March 1865, when Sir Joseph Lister introduced the principle of antisepsis to hospitals by covering a compound fracture with a piece of lint soaked in crude carbolic acid and then covering that with a piece of tin. Through application of this principle not a single case of pyaemia, erysipelas or hospital gangrene occurred in Lister's ward during the following nine months. It is also less than a century since Dr. Ignace Phillip Semmelweis died. His work in the prevention of puerperal sepsis will live for ever. In these days of longevity, a hundred years is not a very long time and during the past century we have seen greater advances in the prevention and cure of disease than in all the centuries previously.

Not long ago hospitals traditionally were regarded as hazardous environments and despite the great advances which have been made they still remain a somewhat hazardous environment.

THE RÔLE OF THE HOSPITAL IN THE PREVENTION OF DISEASE WITHIN ITS OWN ENVIRONMENT

There are three main considerations. First, the control of hospital infections, particularly staphylococcal; second, the elimination of dangerous hazards peculiar to hospitals, thus protecting the health of employees; third, the elimination of dangers to mental health, which are too frequently not recognized. This is particularly true in the pediatric wards.

THE PROBLEM OF STAPHYLOCOCCAL INFECTION

The problems of hospital infections have been recognized since the days of Lister and Semmelweis. Unfortunately, many of the tried and true methods of preventing hospital infections have been neglected since the introduction of antibiotics and the resulting optimism of physicians in treating infections with these drugs.

We, who are interested in preventive medicine, must insure the effective restoration of these principles into hospital administration, through programs of regulation and education. It appears that the prevalence of staphylococcal infections both in the hospitals and in the community, shows no sign of decreasing. Many valuable drugs have lost their effect. Mother Nature is a good friend in many instances, but she is also a cunning adversary. She can overcome even the

¹Presented at the annual meeting of the Alberta Division, Canadian Public Health Association, April 5-7, 1961.

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most advanced of our scientific discoveries. Perhaps this is the explanation of her counter-attack on our scientific advances. Or perhaps, like a true mother, she is endeavouring to instill in us the priceless quality of intellectual humility.

Staphylococcal infections differ from other infections in several ways. These organisms have been described as highly versatile chemical factories. If this were not so, they could not have defied the many new antibiotics. Outbreaks of staphylococcal infections have been encouraged by an indiscriminate use of antibiotics, which has removed many other protective organisms. The availability of antibiotics has also lulled us into a sense of false security. It is a subject in which health officers and public health nurses should take an active interest, as the answer lies in the strict application of proved methods of contagious disease control, both inside and outside the hospital. The preventive aspects of the treatment of staphylococcal infections at home, which may produce a cycle of infection lasting for years in a family, remains a challenge to public health workers.

DEVELOPMENT OF SAFETY CONSCIOUSNESS

Another area where the public health-minded physician or nurse can help achieve considerable success in the prevention of human discomfort and economic loss, is in the development of a safe industrial environment in our hospitals. Our own recent experience has shown that we can reduce the number of lost-time accidents effectively by the establishment of safety committees, and the development of safety consciousness in our hospital employees. We must strive for the establishment of safety committees in every hospital, whether it be large or small. I feel that the public health team can render most valuable service to these committees. Pre-employment examinations and health surveillance during employment is sound policy, both from the economic and humanitarian point of view.

PREVENTION OF MENTAL TRAUMA TO OUR PATIENTS

This is a problem which has been greatly neglected. It is necessary to emphasize the need for tender loving care in the nursing of the sick, particularly of the young. Are we forgetting this in the development of our educational programs for nurses, which remove them further and further from the bedside? With the great reduction in length of stay in hospital, and the very speedy turnover of patients, are we becoming too impersonal in our dealings with the sick? In our efforts to provide a good working environment for our hospital staff, are our visiting hours designed for our convenience, or are they designed for the convenience of patients and the furtherance of their mental well-being while in this strange environment? Are our meal times adjusted more to our convenience than to the domestic habits of our patients? There is no doubt that to be admitted as a patient to hospital can be one of the most de-personalizing incidents in human experience. The answer lies in better preparation of the public for what they may expect in hospitals and in improved training of hospital personnel in human relations. This, of course, applies particularly to children whose limited means of communication render them much more susceptible than the adult to the emotional hazards of a strange environment. Here is an area where excellent co-operation is both possible and necessary between the public health service and the hospitals.

To prove that these factors are important let us consider that approximately two hundred people out of every thousand of the population are admitted each year to hospitals in Western Canada. Each of these patients on the average has about five visitors during the stay in hospital. This means that the equivalent of our entire population visits a hospital at least once a year. Furthermore, hospitals are now the fifth largest employers of labour on the American continent. Need I stress the potential of this great band of workers in the public and human relations field?

THE RÔLE OF THE HOSPITAL IN THE PREVENTION OF DISEASE IN THE COMMUNITY

We have failed as yet to develop adequately this contribution to society. We can offer many excuses. Can we offer an acceptable explanation?

Part of the problem has been the development of super-specialization in the various fields in medicine. In the earlier days of the prevention of infectious diseases, it was indeed natural that specialist health officers would assume an authoritarian role, backed by statute, in relation to the prevention of spread of contagious disease in the community. It has, however, been an unfortunate corollary to this development that the medical profession, in general, has tended to delegate the "disease-prevention" rôle far too completely (although perhaps grudgingly) to the health officer and his team of workers. Socially and economically, it has been much more practical, through a formal public health organization, to establish programs for mass immunization, than to eliminate disease sources.

Another area of hospital function in relation to the community, which has not been well developed is health education. We have fully established in our hospital, and this is also true of other hospitals, the value of prenatal classes. We were pleasantly surprised, when our Ladies' Auxiliary started a program of prenatal classes, that these classes became extremely popular, not alone with the expectant mothers, but with the expectant fathers. We feel that their value is not alone in the teaching of "natural childbirth", but also in promoting better family relationships, and in preparing a welcoming environment for the new arrival. The mental health aspects of prenatal classes probably outweigh considerably the actual physical benefits derived from them. The latter are not inconsiderable, however, in considering the decreased use of forceps, artificial inductions, and hypnotic drugs.

The field of metabolic diseases, particularly obesity and diabetes, also lends itself to adoption by the hospital for public health education purposes. One outstanding example of this is the Obesity Clinic operated by the Hunterdon County Medical Centre, where group instruction on obesity prevention is carried on by hospital staff including physicians, dietitians and nurses. This is organized on the same basis as Alcoholics Anonymous. Such programs, instituted in all our hospitals, might very well reduce considerably the hazards of the various rather preposterous dietary régimes which are being inflicted on the public, through all forms of sales promotion. In addition, they could represent a substantial economic saving to many families who cannot afford the various patent cures for obesity. Obesity is not necessarily an economic problem, but can affect less fortunate members of our society because they are forced into high carbohydrate

diets for economic reasons. Indeed, perhaps the over-all problem of good nutrition might well be tackled in this fashion, and improve both health and economics.

Another potential which has been shunned, and which is also available at the Hunterdon County Medical Centre, is the program of multi-phasic screening. In this program, groups representing church organizations, social organizations, indeed, any group is welcomed to the Clinic, and each individual member is given a multi-phasic test. This consists of a review of the patient's medical history through the Cornell history chart, and a battery of simple laboratory and clinical tests performed by technicians. These tests include blood pressure examination, a single lead electrocardiogram, a chest film, a blood sugar performed by micro-method, and a urinalysis. The results of the tests are analyzed by a physician attached to the program, and where there appears to be a deviation from normal, this information is brought to the attention of the patient's own physician. This information is not conveyed directly to the patient. If the tests are normal, this is reported directly in a letter to the patient, explaining that while this is only an indication of good health, a regular visit to his physician is the best method of preserving good health. Multiphasic screening is an extension of the practice of the free chest X-ray, a requirement in most of our hospitals, and of routine urinalysis and haemoglobin estimations on all patients. Such programs are ideally located and most economically operated in the hospital setting.

THE HEALTH OFFICER AND THE HOSPITAL

Recent resolutions of the Associated Hospitals of Alberta, and of the Alberta Division of the Canadian Medical Association recommend that health officers should be courtesy members of the staffs of hospitals within their territories. This was certainly a step in the right direction. The relationship of the medical health officer to the medical staff, however, needs some definition, and perhaps, indeed, regulation. It must be true that the health officer, as an impartial and non-competitive practitioner of medicine, can lend a great deal to medical staff meetings in hospitals. The area where the health officer can be of greatest service to the medical staff organization is in the workings of medical audit and tissue committees, and also in a liaison capacity between the medical staff and the administration of the hospital. The day is not too distant when our Colleges of Physicians and Surgeons will assume a much larger degree of responsibility for the quality of medical and surgical practice in our hospitals.

The relationship of the health officer to the board of the hospital, however, is an entirely different matter. One of the greatest needs of hospital boards is to have available to them intelligent and impartial professional medical advice. The health officer can help hospital boards in a variety of matters, such as construction programs, medical and hospital staff inter-relationships, selection of personnel, credentials consideration for medical staff appointment, and in the new broad field of hospital and government relationship.

All of this produces certain problems. It is probably true that if the health officer is to become fully integrated into the health services of the community, it is important that he should develop an increasing interest in hospital administration. The normal work of a health officer in the prevention of communicable

disease, the supervision of sanitation and so forth, is rapidly diminishing. It is doubtful if it will ever completely end, but it certainly is reducing with the great advances in sanitation and the disappearance of epidemics. His inspection function is now frequently and successfully delegated to well-trained sanitary officers. A challenging opportunity in the medical administration of the rural hospitals in his area may be developing for the health officer. We then ask the question, is the training of the health officer in public health adequate to assume this rôle immediately?

On examining the curriculum of the Diploma in Hospital Administration, and comparing it with the curriculum for the Diploma in Public Health, we find that there are a considerable number of areas common to both. It would seem practical, therefore, to devise a special short course in hospital administration which could be under university auspices or be a university extension course. It would be valuable to physicians holding the Diploma in Public Health. Such a course might deal with operation and capital cost financing of hospitals, medical staff organization, material on the Canadian Council for Hospital Accreditation, and other problem areas.

A facet of this suggestion which might make it more attractive is that the salary of the health officer might be considerably improved, by making an additional stipend available to him from the hospitals, to compensate for this additional work. This would also be of benefit to hospital plans, as they would be assured of an impartial judge of the quality of medical care given in the hospitals. It is certainly true that problems of quality of medical care are not confined to the major hospitals. In fact, where a large and organized medical staff exists with suitable machinery for self-government, the quality of medical care is certain to be higher. The main problems are in the smaller institutions, where frequently physicians have access to a relatively large number of beds, without the doubtful benefit of the screening process of bed shortage with which we are so familiar.

I have perhaps neglected the rôle of the public health nurse and the sanitary officer in relation to hospitals. This does not mean that I do not appreciate the tremendous value which they can be to the hospitals, in health education and pre-natal preparation, in food sanitation and, indeed, in many aspects of the operation of the hospital.

For the future, with the development in geriatric care, one can visualize a great expansion of the rôle of the public health nurse, in connection with the training of families in caring for the elderly. Although the present provincial program should contribute enormously to the care of the chronically ill and the aged, it is to be hoped that the presence of these institutions will not completely remove the sense of responsibility of families for caring for relatives. The public health nurse can give considerable support to families in caring for chronically ill or aged patients in their own home environments.

It is to be hoped that the policy of the chronic hospitals will permit patients to return home for vacations, or to be admitted to the chronic hospitals so that their families can enjoy a vacation. In this give-and-take between the community and the chronic hospitals, I can visualize a rewarding field of endeavour. Hospitals can also make use of the services of the sanitary officer to a much greater degree than is presently the case, in educating their food handling staff. By and large, I feel that the health officer and his team can integrate very easily

with the tremendous new developments which are occurring in the hospital field in this province. This integration should increase the stature of the health team rather than in any way diminish it.

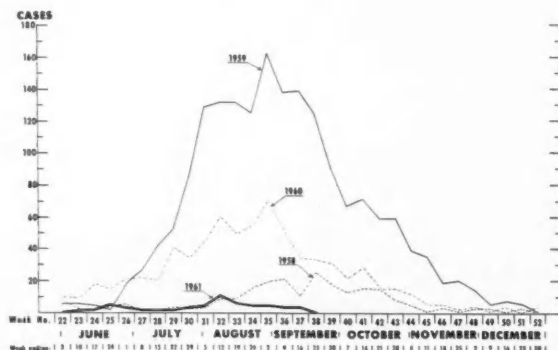
Summary

The rôle of the hospital in the prevention of disease has been considered, first, in terms of the public health problems inside the hospital, namely, the control of contagious diseases, accident prevention, and the promotion of mental health, and secondly, the rôle of the hospital in preventing disease in the community is discussed emphasizing the need for the health education of the population and greater use of the facilities of the hospital for promoting positive health. In considering the rôle of the health officer, it is suggested that he can play an important part in the improvement of the standards of patient care in many of our hospitals.

PARALYTIC POLIOMYELITIS IN CANADA

Weekly incidence to 38th week (September 25)

1961 and specified years



The reported incidence of paralytic poliomyelitis, both in Canada and the United States, remains at a low level. No cases were reported in Canada during the week of September 23 in contrast with 34 cases in 1960 and 126 in 1959. To this date 119 cases (6 deaths) have been reported in contrast with 751 cases (65 deaths) in 1960 and 1,364 cases (123 deaths) in 1959.

From the weekly reports prepared by the Division of Epidemiology, Department of National Health and Welfare, Ottawa.

A Review of Two Years' Experience in Providing Extension Courses In Environmental Control¹

ROBERT STEELE, M.D., D.P.H.²

DURING January 1960 and January 1961, two four-week Extension Courses in Environmental Control were presented at the University of Saskatchewan. The courses, in the form of in-service training for sanitary officers, were designed by the Department of Social and Preventive Medicine at the request of the Department of Public Health for the Province of Saskatchewan and followed many years of interest by sanitary officers themselves.

In the first course, 12 sanitary officers were selected to attend and 13 were selected to attend the second course. A registration fee of \$25 per student was charged by the University and this expense was met by the employing authorities. The participants in the course remained on salary and were able to claim subsistence allowance while away from home.

While the course had been planned initially following discussions with representatives of the sanitary officers, the Provincial Department of Public Health, and the University, substantial help was received from other centers in which similar programs had been arranged.

Those in the Department of Social and Preventive Medicine who were given the responsibility of creating this course felt that this was an opportunity to do more than review new developments in the more technical aspects of the duties of the sanitary officer, but rather to stimulate an awareness of current socio-medical problems in the community which he serves and have some familiarity with major disease problems from the epidemiological standpoint. Moreover, in order to further his effectiveness as a member of the community health team, substantial attention had to be paid to the relationship existing between the sanitary officer and other members of that team.

The early part of both courses was given over to the examination with teachers from the Center for Community Studies of the "anatomy and physiology" of the community and the factors which bring about change—this being the logical starting point in an area of operation closely linked with the prevention, diagnosis and treatment of community malfunction or disease. In ensuing lectures emphasis was placed on the examination of certain indices of the health and ill health of the community, this being done through the medium of vital statistics. From a discussion of these indices and factors influencing

¹Presented at the annual meeting of the Canadian Public Health Association, June 6-8, 1961, held at the Hotel Saskatchewan, Regina, Sask.

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trends in these statistics, there was a natural progression to the consideration of some of the techniques of epidemiology as applied to the investigation of infectious and noninfectious diseases, e.g. accidents, with which the sanitary officer is becoming increasingly involved. In order to demonstrate further the scope and complexity of the science of epidemiology, sessions were held under the general title of "Social Variables in Sanitation", emphasizing how social characteristics of populations can influence their susceptibility and immunity to certain diseases.

Among the topics tackled in the remainder of the course were: human nutrition, the zoonoses, farm safety, entomology and parasitology, milk processing, housing, meat inspection and processing, lighting and ventilation, radiation, public health law. Attention was placed particularly on the relationship of subject matter to the Saskatchewan scene. Time did not always allow the examination of certain topics in great depth but reference material was freely provided so that the student could pursue his interests at a later date.

Didactic instruction was kept to a minimum, the seminar method being extensively employed to explore interests, clarify problems and establish an effective rapport between instructors and the group. Films, demonstrations and other visual aids were freely used throughout the courses. Only one field visit was made in each course since all participants had extensive experience in this area.

One half-day was set aside in each of the four weeks in the courses, during which the "Community Clinics" were held. In the first three clinics, the topics covered during the preceding weeks were discussed with particular attention being paid to the value and relevance of the material presented to the work of the sanitary officer. Special consideration was given to how the class and instructors operated as a group and factors which helped group action and those which acted as blocks to group action, this being used to exemplify how effective community action can be obtained and the problems which may be encountered.

In the final community clinic of each course an assessment was made of the course as a whole, considering (a) subjects covered with reference to applicability of new knowledge and quality of presentation, (b) allocation of time to various subjects, (c) content of the course in the future, (d) attitudes towards the preparation of a dissertation, and (e) the "highlights and low-lights" of the program.

The institution of the Community Clinic is an important innovation in a course of this kind and the results of the evaluation sessions have been carefully recorded and were used in planning for the second course held in 1961 and will be used in the planning of future courses in environmental control.

The writing of a short dissertation was made a requirement of the course. Advance notice of the need to contribute a short critical essay was given to the students before each course started. This permitted each student to turn over in his thoughts, subjects that he would like to follow up and write about during the course. Each member of the course was interviewed in the first week and a decision reached on the subject to be tackled in the dissertation.

Some of the topics chosen for dissertations were (1) Sanitation is a Way of Life, (2) The Problem of Food Poisoning—with Special Reference to an

Outbreak in a Survey Crew, (3) Environmental Control in Resorts, (4) Problems Involved in the Production of a High Quality Milk Supply, (5) The Contribution of Plumbing to Public Health, (6) An Appraisal of Substandard Housing in Rural Areas of Saskatchewan, (7) Social Problems in a Changing Community, and (8) Partial Evaluation of Legislation Affecting Environmental Control in the Province of Saskatchewan.

The essays demonstrate the range of experience and interests of the sanitary officers working in this province. There is, furthermore, demonstration of an awareness that in order to be effective in introducing measures for environmental control (and maintaining control) the sanitary officer must know the social constitution of the community which he serves. Enthusiasm for this type of project was high and it was recommended that the submission of a dissertation remain obligatory in any future course. In a follow-up letter from a senior sanitary officer there is the following recommendation: "Would it be of value and a good experience if each student were assigned . . . a fifteen-minute talk in addition to the written essay? It will be practice in public speaking and encourage more utilization of references from the libraries?" This suggestion will be seriously considered in the planning of future courses.

The writing of a dissertation allowed sanitary officers to develop subjects of interest through the media of discussions with experts in the field and by private study in the libraries on the campus—time and opportunity which they do not readily have in their daily work. On completion of the course each sanitary officer was sent a copy of all the dissertations presented by his class. Many sanitary officers have followed up their interests in specific topics by continued contact with teachers. Several dissertations were considered worthy of publication in the journals subscribed to by those interested in environmental control. Several were worthy of presentation at a national conference in public health. This is an area of the course that is worth continuing and developing since many members of the health team have little or no experience in writing other than official reports, public speaking or research and this is a field many find most stimulating and rewarding.

The Dean of the College of Medicine participated in the two Extension Courses as well as teachers from the following departments on the University campus:

(1) Department of Social and Preventive Medicine, (2) Center for Community Studies, (3) School of Home Economics, (4) Physics, (5) Bacteriology, (6) Dairy Science, (7) Engineering—Agriculture, Electrical, Mechanical, (8) Biology, and (9) Farm Management; and from other organizations and Centers, (a) Safety Supply Company, (b) Division of Laboratories of the Province of Saskatchewan, and (c) City Health Department, Saskatoon (Veterinarian).

The teachers were struck by the interest of the students and their keenness to ask questions and derive maximum benefit from this opportunity which had been given to extend their knowledge. For many of the teachers this was the first opportunity they had had to meet with sanitary officers and learn a little of the essential work that was being carried on by them in public health. A special word of gratitude has to be expressed to all the teachers who contributed so willingly to these Extension Courses.

Canadian Journal of Public Health

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THE HEALTH DEPARTMENT AND CHRONIC DISEASE CONTROL

TAKING into consideration the number of persons suffering from chronic disease and the character of their illnesses, it is evident that government participation is essential to the carrying out of a comprehensive, effective, chronic disease control program. The local official health agency, having established its usefulness in the field of preventive medicine, is the logical organization to assume responsibility for the medical aspects of such a service, leaving the welfare phase to its official counterpart in the welfare field. There is, in some quarters, a rather persistent reluctance to extend official interest into this field and, in less conservative circles, uncertainty with respect to the scope of the service to be offered.

Reasonable arguments can be advanced for a maximum of official support. In the main, they vary only in the extent to which they emphasize the humanities and in the percentage of the over-all cost to be borne by the governments concerned. Official reluctance to intervene is due primarily to the high costs involved, but may be attributed also to the lack of enthusiasm shown by some of those prominent in public health administration. This lack of enthusiasm is probably due to the difficulty of fitting the principles of control as they apply to communicable diseases to the disabilities of the aged and infirm. The shift from epidemiology to etiology is not as simple as it might seem to the uninitiated.

It has been pointed out that we do not have to change our philosophy of communicable disease control very radically to apply it to chronic disease control.* Indeed, those who say that chronic disease is "no part of the official public health agencies' concern" forget the important role of syphilis and tuberculosis control in the prevention of chronic disease. They also forget the enormous potential for chronic disease control in programs of dental health, maternal and child health, sanitation, and nutrition.

Peterson* asks what is the essential difference in screening for tuberculosis or venereal disease on one hand by tuberculin test, X-ray or serology, and the

*Peterson, P. Q.: *Amer. J. Public Health*, 1960, 50: 134.

detection of diabetes or glaucoma on the other hand by blood sugar or tonometry? Where lies the distinction between follow-up and referral for visual acuity in a child or tonometry in an adult? What is the difference between group teaching in maternal and child health or for diabetes or obesity? It should not take too much imagination to extend the rehabilitation of a crippled child or a case of tuberculosis to include an arthritic or a cerebrovascular accident. The co-ordination resources necessary to handle a case of poliomyelitis are essentially the same as those for other chronic illnesses.

There are, admittedly, certain difficulties to be overcome in embarking on a chronic disease program. First of all, the enormous size and complexity of the problem must be appreciated, and the fact accepted that progress will be slow. Other challenges to public health have loomed as large previously, and originally have appeared to be as complex. Also, we must be convinced of the absolute necessity of working together with many other agencies and professional groups, including the private practitioners. If we cannot ensure co-operation among these groups, we are defeated before we begin. Teamwork, however, is certainly nothing new to public health personnel. The social and economic factors in these diseases are enormous and we cannot expect to cope with the problem by employing only medical and nursing know-how.

One of the worst stumbling blocks is our lack of knowledge concerning etiology in chronic disease. The greater number of causes are either unknown or, at best, multiple, making it impossible to use methods of "primary" prevention in most cases. We must be able to accept the concept of "secondary" prevention, that is, prevention of progress of disability, to control many of these conditions.

The present and the potential role of the private practitioner in this type of service should at no time be lost sight of. Before any scheme of this kind is initiated the part to be played by all the participating agencies, including the medical profession, should be well defined and there should be a satisfactory agreement in principle. The private physician should be encouraged to continue to maintain a professional interest in his own patients, even when such patients are placed in institutions for treatment and/or rehabilitation. The setting up of such a program will require much administrative ingenuity and the utmost co-operation among the public, the medical profession, and the official agency. The problems are numerous and complicated but these factors should not prevent an early effort being made to solve them.

Vital and Health Statistics

METHOD OF CERTIFICATION OF CAUSE OF DEATH

A. H. SELLERS,¹ M.D., D.P.H., W. B. MARR,² and INA M. JUDSON³

ONE of the many factors influencing the reliability and comparability of mortality statistics is the basis of diagnosis of cause of death. It is of interest to know, therefore, what proportion of

deaths from different causes are certified by coroners and by medical practitioners and in what proportion a post-mortem examination was carried out.

Data on the method of certification of deaths in Ontario, whether by a coroner or by a medical practitioner, and the frequency of autopsies for a selected group of cause-of-death categories, are presented in the accompanying table. These data were tabulated by the Registrar-General's Branch and exclude the deaths of residents of Ontario which occurred outside the province.

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²Head, Public Health Division, Medical Statistics Branch.

³Statistician, Office of the Registrar-General for Ontario, Parliament Buildings, Toronto, Ont.

DEATHS BY CAUSE, METHOD OF CERTIFICATION AND AUTOPSY
RESIDENT DEATHS IN ONTARIO, 1959

Cause of Death	I.C.D. Number	Total Deaths	Coroner		Medical Practitioner	
			P.M.	No P.M.*	P.M.	No P.M.*
Infective and parasitic diseases	001-138	401	38	36	114	213
Neoplasms	140-239	8,065	109	331	1,723	5,901
Diabetes mellitus	260	616	23	111	87	395
Vascular lesions of central nervous system	330-334	6,572	192	839	460	5,081
Rheumatic fever, rheumatic heart disease	400-416	496	29	44	118	305
Arteriosclerotic and degenerative heart disease	420-422	16,881	501	4,269	1,092	11,017
Other heart disease	430-434	589	28	87	70	404
Hypertensive disease	440-447	1,407	27	112	145	1,123
Influenza, pneumonia and bronchitis	480-502	2,551	205	592	381	1,372
Ulcer of stomach and duodenum	540, 541	342	20	30	149	143
Intestinal obstruction, hernia	560-1,570	305	30	30	106	139
Cirrhosis of liver	581	431	31	35	168	197
Nephritis and nephrosis	590-594	381	3	13	84	281
Pregnancy, childbirth, and puerperium	640-689	73	29	3	24	17
Congenital malformations	750-759	861	83	52	338	388
Birth injury, asphyxia, atelectasis	760-762	906	49	44	344	469
Other diseases of early infancy	763-776	1,304	51	65	317	871
Symptoms, senility, ill-defined	780-795	210	9	63	5	129
All other diseases	Rest	4,359	315	538	961	2,543
Accidents	E800-962	3,193	1,084	1,397	194	517
Suicide, self-inflicted injury	E970-979	520	101	393	15	11
Homicide, and operations of war	E980-999	59	46	9	2	2
TOTAL		50,522	3,003	9,093	6,897	31,518
Per Cent		100.0	5.9	18.0	13.7	62.4

Source: Registrar-General's Branch (tentative figures).

*Includes post-mortem not stated.

Of the 50,522 recorded deaths during 1959, 12,096 or 23.9% were certified by a coroner; in 24.8% of these cases an autopsy was performed. There were 38,415 deaths certified by a medical practitioner; in 6,897 or 18% of these an autopsy was reported to have been performed. In only 11 cases was the certifier other than a coroner or medical practitioner or unknown.

Of the deaths certified by coroners (12,096), 1,031 or 8.5% were assigned to vascular lesions of the central nervous system, 4,770 or 39.4% were attributed to arteriosclerotic and degenerative heart

disease, and 3,030 or 25.0% were due to accident, suicide or homicide.

There is wide variation between cause-of-death categories in the proportions confirmed by post-mortem—from 6.7% for symptoms, senility, ill-defined causes and 9.9% for vascular lesions of the central nervous system, to 72.6% for complications of pregnancy, childbirth and the puerperium and 49.4% for ulcer of stomach and duodenum. A post-mortem examination was carried out in 19.6% of all deaths from all causes.

Further details for certain additional cause-groups, are available on request.

Environmental Sanitation

TOXIC HAZARDS IN INDUSTRY AS ILLUSTRATED BY CADMIUM

A. J. NEUMANN, C.S.I.(C)¹

THE incorrect handling of toxic materials is an ever-increasing problem. New uses are being found for many products which contain metals such as zinc, cadmium and lead for insecticides, and for solvents of many kinds.

The first concern of a serious-minded employer should be for the health and welfare of his employees. He knows that a sick worker is not a productive worker. Hand in hand with the health of the worker goes high morale and the maintenance of a happy working force. When a toxic material is used improperly in a workshop or industry, the health of the employees suffers and dissatisfaction spreads.

It is found often that skilled workers are unaware of the nature of the materials with which they work and at times even the employers and owners do not know the dangers which they are asking their employees to face, especially where poisons such as lead are used which tends to accumulate in the body over long periods. The need for "on the job" training and for inspection by qualified public health sanitarians is obvious.

¹Sanitary Inspector, City of Lethbridge Health Unit, Lethbridge, Alberta.

CADMIUM

This element is known to us as a shiny metal, harmless in appearance, but dangerous if improperly handled. It occurs in zinc ores in small quantities. Cadmium melts at 609.6° F. and boils at 1412.6° F. It is soluble in acids including the acids found in foods, particularly fruit. This explains the occurrence of cadmium poisoning following the ingestion of food prepared with cadmium plated cutlery or cookware.

Cadmium is used in industry because it is capable of being highly polished. It is not difficult to apply in commercial processes and it resists corrosion. It is used normally as a constituent of alloys. Some of the uses of cadmium and its compounds are electroplating in the manufacture of jewelry, electrical condensers, pigment, cadmium vapour lamps, alkaline storage batteries and solders. It is also used as a substitute for tin in anti-friction metals, particularly in metals used in bearings for automobiles and as a coating for marine hardware and aircraft parts.

Cadmium is taken into the body by inhalation and ingestion. Forms in which this element are toxic are vapours, fumes,

dust, and dissolved in foods. When heated in air, cadmium burns, producing brown fumes. If these are breathed in high concentrations, cadmium poisoning may result. When cadmium is heated, vapours are produced which may cause poisoning. Dust results from grinders and lathes and occurs as air-borne particles in spray painting. Cadmium may be ingested by contaminated hands or clothing, in smoking or eating.

The symptoms of acute poisoning from the inhaling of fumes, vapours or dust are dryness of the throat, vomiting, headache, cough, pain in the chest, and loss of appetite. If high concentrations are breathed, bronchopneumonia may result with oedema of the lungs. The symptoms of cadmium poisoning from ingestion are increased salivation, attacks of choking, persistent vomiting, abdominal pains, diarrhoea and painful defecation or urination. The symptoms in chronic poisoning resulting from repeated inhalation of dusts or vapours are digestive disturbances, loss of appetite and vomiting. It is not definitely known if cadmium has an accumulative effect.

The American Standards Association states that the approved allowable concentration of cadmium in the air is 1 milligram per 10 cubic meters of air. Authorities consider that any process involving the use of cadmium likely to cause vapours, fumes or dust, is potentially dangerous to health.

AIR SAMPLING

The presence and concentration of cadmium in the air can be determined in the laboratory by using samples of air or dust. Collection is made with an impinger for dust and an electrostatic precipitator for fumes. The *impinger* equipment consists of a standard impinger bottle containing an acid solution. A small air pump is used to draw the sample of air through the acid solution. The pump is regulated to that the quantity of air drawn through the bottle is known. The pump operates satisfactorily at 1 cu. ft. per min.

The *electrostatic precipitator* draws the fumes through a built-in tube. On the front of this tube a needle is attached without disturbing the flow of air and around the needle a sampling tube is

attached. The precipitator is then operated by suitable controls so that the attached needle is energized with low amperage electricity. It is not difficult to determine the proper voltage as one is able to see material precipitating on the tube. A small fan in the rear of the precipitator draws contaminated air over the needle and the fumes precipitate out on the inside surface of the attached tube. The precipitator should be placed at approximately the distance at which the worker would breath in the normal course of his work: the sample tube is then removed and capped at both ends. A minimum of 1 cubic meter of air should be drawn as a sample. The larger the sample taken the more adequate is the material for analysis in the laboratory. The presence of zinc may also be determined in this manner.

Because of the minute amount of cadmium allowed in the air (0.1 milligrams per cubic meter, American Standards Association) one may consider that the determination of the exact amount is not necessary. However, there is no substitute for an accurate laboratory report when pressing a case before a shop owner or manager.

CONTROL

Control measures which are employed to safeguard the health of the worker include *exhaust ventilation*. This should be supplied in the form of fans to remove the heat, fumes, dust, smoke, etc. As well as an exhaust fan, a suitable inlet should be supplied for fresh air. Where practical, local exhaust ducts should be installed, providing a movement of 100 linear feet of air per minute at the point of operation. The ducts should be supplied in the form of booths or movable hoods. In addition to exhaust fans and exhaust ducts in enclosed spaces, it may be necessary to provide air supplied respirators. Strict personal hygiene should be insisted upon by the management of the shop. Last, but not least, the worker should be educated to know the material with which he is working and the proper use of protective equipment.

The following account of an investigation of a local problem illustrates the procedure that may be followed. An in-

spection was made of a workshop, housing a machine shop, a heat-treating room and a welding room. The workshop was located in a new concrete building and was provided with forced air ventilation in the form of air ducts in the ceiling. The ventilation proved to be unsatisfactory and a 10-in. fan was installed in a window in the welding room. In the summer the doors were opened, which proved of great help in removing smoke and fumes. During the inspection, many complaints were heard with regard to poor ventilation in the welding room, and as a result, in the entire shop. It was said that on days when the welding room was used the whole shop was filled with smoke of a very repulsive nature and that headaches and general illness were complained of by several workmen. Both cadmium and zinc were included on the list of materials heated in the welding room. The welders were provided with air supplied respirators, but did not use them as they considered them to be too hot and too cumbersome. Medical records failed to give any proof of illness resulting from the fumes in the shop.

The report of the inspection asked that adequate ventilation be supplied. Months followed, but no action was forthcoming. On a second inspection it was decided that an experiment should be performed to simulate a medium heavy working day

in the shop. About one-half dozen cadmium bolts about one and a half inches long and four sheets of galvanized iron, 8 in. \times 12 in., were burned. Samples were taken using a standard impinger and an electrostatic precipitator. A gas sample and dust samples were taken also, the dust being gathered from the tops of the door and window frames.

The precipitator was placed about 2 feet and the impinger about 4 feet from the welding operation. Both were operated about 25 minutes, drawing 25 cubic feet of air. On completion of the tests, the electrostatic sampler tube contained 433 mg. of solid material per cubic meter of air. The concentration of zinc in the air using the electrostatic precipitator showed 240 mg. per cubic meter of air and 28 mg. per cubic meter of cadmium. With the standard impinger, the concentration of zinc in the air was shown to be 15 mg. per cubic meter and .43 mg. per cubic meter of cadmium. (The maximum allowable concentration of cadmium is 0.1 mg/cu m and of zinc, 15 mg/cu m.) The dust sample contained only iron and zinc. The iron content was 6.3% and the zinc content 5.3%. It was not possible to determine the small quantities of impurities in the gas sample.

As a result of these findings, approval was shortly given by the owner for an adequate system of ventilation.

BOTULISM IN CANADA

In the past six years ten outbreaks of botulism have occurred in Canada, involving 24 persons of whom 15 died. In all instances, uncooked products of fish and marine mammals were the vehicles. Coastal Indians in British Columbia were infected in three instances, while on six occasions the victims were Labrador Eskimos. The tenth episode involved a woman in Penticton, B.C., who recovered from type E botulism due to imported salted herring.

Over a 40-year period 24 cases of botulism have been recorded in Canada, affecting 87 persons, 50 of whom died. The implicated foodstuffs in two-thirds of the occurrences have been fish and marine mammals. The strains were identified as four type A, one type B, and seven type E.

ANNUAL REPORT OF THE ASSOCIATION

1960-1961

PART V

REPORT OF THE COMMITTEE ON RECRUITMENT OF PUBLIC HEALTH PERSONNEL

R. G. Struthers, M.D., Chairman

Dr. G. R. F. Elliot, Vancouver

Dr. E. S. Orford Smith, Edmonton

Dr. M. Acker, Regina

Dr. Murray Cleghorn, Winnipeg

Miss Isabel Black, Toronto

Dr. A. Groulx, Montreal

Dr. R. S. Langstroth, Fredericton

Mr. W. J. Chisholm, Sydney

Dr. O. H. Curtis, Charlottetown

Dr. J. W. Davies, St. John's

Dr. A. J. Rhodes, Toronto

Dr. E. J. Young, Toronto

THE RECRUITMENT Committee was organized with a minimum of one member from each province and is so constituted that the various fields in public health are represented.

Letters in connection with the work of the committee were sent to all deputy ministers as well as to the members of the committee. There was a good response and numerous suggestions and recommendations were made. These were considered and added to by the Toronto area members.

One of the suggestions made by members in several provinces was that the brochure entitled "For Physicians . . . Public Health as a Career" be revised and distributed to medical schools through appropriate channels. This was done and the revised brochure is entitled "For Physicians . . . Preventive Medicine and Public Health as a Career".

Since many of those who apply for the D.P.H. course are physicians who may have spent a number of years in practice, it has been suggested that a brochure similar to that distributed to the medical schools, but with a somewhat different approach be prepared. This is under consideration.

In conjunction with the Public Health Nursing Section a leaflet entitled "Public Health Nursing, An Adventure, Serving the Community" was prepared and published. Copies of the leaflet were sent to deputy ministers of health, attention of directors of public health nursing, for distribution to schools of nursing.

The committee proposes to make another survey of the needs for trained members in the various fields. It is appreciated that the needs in the various parts of Canada vary greatly. It is recognized that in the field of Sanitary Engineering, there exists a serious shortage of engineers qualified in this field. Similarly there has been difficulty in meeting the needs in Dental Public Health. In the laboratory field the provision of the Diploma in Bacteriology

in Canada will be most helpful in providing qualified physicians and other scientists in the laboratory field.

In world-wide public health work the role of the Public Health Veterinarian is recognized as of the greatest importance. In Canada there has been a falling off in the number of veterinarians engaged in Public Health. The Committee is of the opinion that there is a need for a redefining of the role of the public health veterinarian.

In the field of Public Health Education there is the continued need for qualified directors. This problem awaits the clarification of the work of public health educators.

There is a need for the continued recruitment and training of laboratory technicians.

Sanitary inspectors are second only in numbers to public health nurses in departments across Canada. In the two provinces where formal instruction is provided, there is no problem of recruitment. In other provinces needs exist.

REPORT OF THE COMMITTEE ON THE ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA

C. B. Stewart, M.D., Chairman

Dr. Jules Gilbert, Montreal

Dr. George Walton, Regina

Dr. Milton H. Brown, Toronto

Dr. James M. Mather, Vancouver

Dr. G. D. W. Cameron, Ottawa

Corresponding Members

Dr. J. H. Baillie, Toronto

Dr. M. R. Elliott, Winnipeg

Dr. A. Somerville, Edmonton

THIS COMMITTEE serves in a dual capacity, being both an Association committee and also the Specialty Committee in Public Health of the Royal College of Physicians and Surgeons of Canada. The following report is given in its capacity as a committee of the Canadian Public Health Association.

A meeting of the Committee was held in Halifax during the annual convention of the Canadian Public Health Association. Consideration was given to the draft of a report to the Royal College of Physicians and Surgeons on the subject of certification and fellowship. Comments have been received from a number of the Committee members not able to attend. In the light of these comments and the discussion at the meeting certain modifications were made in the draft report. After the meeting this was again transmitted to all members by mail and a final report prepared for submission to the Royal College of Physicians and Surgeons.

The report submitted to the Royal College of Physicians and Surgeons is as follows:

"The Committee of the Royal College of Physicians and Surgeons of Canada on Certification in Public Health submits the following comments in response to the request of the Council on the proposal that Certification examinations be discontinued in favour of Fellowship examinations only.

The Committee records the opinion that the change from Certification to Fellowship examination is not considered essential in the Specialty of Public Health, but would not be opposed if the majority of other specialty groups wished to make the change and the Royal College of Physicians and Surgeons should decide upon such action.

Public Health is one of the specialties in which Certification only is now open. The elimination of the Certification programme would mean that there would be no recognition of this specialty within the Royal College, unless at the same time a Fellowship were introduced. It is recognized, however, that there is a dual system of specialization now in existence in Public Health, some having the University qualification of D.P.H. only, and others having the higher qualification of Certification by the Royal College of Physicians and Surgeons. Such a dual system is likely to continue whether or not Certification is changed to Fellowship.

In the event that the Certification examinations should be discontinued, and Fellowship examinations introduced in Public Health, the Committee expressed the firm view that it is essential such an examination should be an examination in Public Health and not an examination in Medicine modified for Public Health.

The Committee recommends the following programme of training as the minimum requirements for admission to examinations for the Fellowship in Public Health, if such is approved.

1. An approved general internship of at least one year.
2. Four years of Graduate Training in addition to the general internship as follows:
 - (a) One academic year in a University School of Hygiene in an approved center, leading to the Diploma in Public Health or an equivalent Degree.
 - (b) One year of field work following the Diploma in Public Health under the direct supervision of a specialist in Public Health in an agency approved by the College for Graduate Training.
 - (c) One year of resident training in Medicine, Paediatrics, Obstetrics and Gynaecology, Tuberculosis, Psychiatry, or a year divided between any two of these fields.
 - (d) One further year of Training as follows:
 - (i) One additional year of field work under the direct supervision of a specialist in Public Health in an agency approved by the College for Graduate Training. Such a second year of supervised training may be in a unit with a specialized programme in one field of Public Health.
 - (ii) One year in an approved Course of study and training at a Hospital or University center in Canada or abroad in a field related to the specialty of Public Health; e.g., Microbiology, Epidemiology, Biostatistics, Medical Administration, or other Medical or Social Sciences.
 - (iii) A further year of clinical training as under 2(c).
 - (iv) A year of training in a general practice setting approved by the Royal College.

The Committee recommends that the Royal College of Physicians and Surgeons in collaboration with the Canadian Public Health Association and the provincial and national public health departments make the necessary provisions for the inspection and approval of field training units in Public Health.

The Committee recommends that a field training unit should consist of an organized Public Health unit with at least one qualified Specialist in Public Health, with a staff sufficient in number and of adequate competence to carry out a broad general programme in all major fields of Public Health and to train a junior Public Health Officer. The senior staff member in charge of the training programme should be a Certificated Specialist in Public Health or have equivalent qualifications. If a second year of supervised training is provided the Specialist-in-training might rotate through a number of units with specialized programmes or spend a full year in one such programme."

Receipt of this report has been acknowledged by the Royal College of Physicians and Surgeons of Canada. No other official information has been obtained. It is understood, however, that the Royal College of Physicians and Surgeons does not intend to proceed with the elimination of Certification except on the specific request of the specialty society directly concerned.

It is recommended that the Canadian Public Health Association consider ways and means of implementing the recommendation regarding field training in Public Health.

REPORT OF THE COMMITTEE ON SALARIES AND QUALIFICATIONS OF PUBLIC HEALTH PERSONNEL

E. J. Young, M.D., D.P.H., Chairman

AT ITS ANNUAL meeting in Halifax, Nova Scotia, May 31 to June 2, 1960, the Association adopted the 1960 report of this Committee. The 1960 report contained the fourth revision of the Recommended Qualification Requirements and Minimum Salaries for Public Health Personnel in Canada. It was published as a pamphlet and in the Journal of the Association. The committee which prepared this report consisted of Dr. L. A. Clarke, chairman, Dr. W. Mosley and Dr. G. W. O. Moss. At a meeting of the Executive Committee in October 1960, it was decided that it is desirable that the work of this Committee be continued and that further revisions will be required. The Executive Director was appointed interim chairman of the committee. The committee has not been active this year, but subject to the approval of the Association intends to continue its studies and prepare further revisions as required. In the next revision emphasis will be placed on clarifying the duties and qualifications of the various classifications.

REPORT OF THE COMMITTEE ON SOCIAL SECURITY (MEDICAL CARE SECTION)

Alexander Robertson, M.B., D.P.H., Chairman

AT THE LAST meeting of the Executive Council, in Halifax in 1960, the duty of preparing a report on Canadian Social Security was laid upon the Medical Care Section. At the Medical Care Section's business meeting it was agreed that the Committee on Social Security should be the Executive of the Medical Care Section.

During the whole of this year the Executive Committee of the Medical Care Section, which is in Saskatchewan this year, has had two major pre-occupations. One of these has been the major involvement of each member of the Committee in different aspects of Saskatchewan's own Medical Care planning, and the other has been the responsibility in preparation of the Annual Convention. At a meeting of the Executive in December, the matter of the report on Social Security was drawn to the attention of the Executive by the secretary. It was ascertained that not only the Saskatchewan members of the Executive, but the one officer resident elsewhere would be quite unable to undertake a job of this magnitude during the present year. The subject was tabled for further discussion, with the thought that we would likely refer the matter back to the Executive Committee with the suggestion that the recently appointed Executive Director of the Association would be able to take on the job.

In the meantime, the Canadian Public Health Association set up a special drafting committee to prepare a brief for the Royal Commission on Health. It seems to the members of this Executive that the Drafting Committee will have to do, in relation to the health aspects of Social Security, almost precisely the task which had been previously assigned in a general way to the Committee on Social Security. The Executive of the Medical Care Section therefore wishes to recommend to the Executive Council, that this matter be handled through the Drafting Committee. The Executive also suggests that any members of the Medical Care Section who have an interest in this subject, or who may have a special viewpoint to put forward, should be advised to communicate with Dr. F. B. Roth as Chairman of the Drafting Committee.

Association News

The 1961-62 Executive Committee held its first meeting in Toronto on Saturday, September 9. The Association's President, Dr. W. G. Brown, was in the chair. Members present were Drs. Clarke, Defries, Groulx, Mosley, Moss, Rhodes, and Young, and Misses Black and Leask.

Among the many subjects discussed were the Consultant Advisory Service in Public Health, the work of the committee preparing material for submission to the Royal Commission on Health Services, the 1962 meeting in Toronto, and appointments to committees.

The Executive Council at its meeting in Regina directed that the Executive Committee should advise and assist the Executive Director in the administration of the Consultant Advisory Service. The Executive Director gave a progress report on the service. One project is presently under way and another is authorized and it is expected that this second study will be done this fall. The Committee discussed methods of administration and other aspects of the service.

The Executive Council had also authorized the Executive Committee to have a committee prepare material for submission to the Royal Commission on Health Services. Dr. W. G. Brown is chairman of this committee and the Executive Director is secretary. As a result of receiving a communication and documents from the Royal Commission, the Association's committee

met early in August and at the invitation of the Commission prepared a statement of some of the principles which the C.P.H.A. feels should guide the Commission with its inquiry and suggestions of some of the areas which it feels should be covered. This statement was discussed with the Executive Committee and when amended and edited it is to be sent to the Commission. The Association has also informed the Commission that it desires to submit a brief at the public hearing in Ontario.

The Executive Committee appointed Dr. William Mosley as chairman of the Committee on the Certification of Sanitary Inspectors and agreed that the Association's representatives on the Specialty Committee in Public Health of the Royal College of Physicians and Surgeons should be reappointed.

The meeting of the Executive Council which is planned for November 18 was briefly discussed. Every effort is to be made to have the provincial branches represented at this meeting.

Consultant Advisory Service

The first project facilitated by the Association's Consultant Advisory Service, a study of the program of the Nova Scotia Department of Health, began in the middle of August. The study is being conducted by Dr. Milton Brown assisted by Dr. Cope Schwenger.

News Notes

International

The Inaugural Ceremony of the Sixteenth International Tuberculosis Conference took place in Toronto on Sunday, September 10. Dr. G. J. Wherrett, Executive Secretary, Canadian Tuberculosis Association and President of the International Union Against Tuberculosis, presided. The conference was held from September 10-14 and was attended by world leaders in the field of tuberculosis.

National

School of Hygiene, University of Toronto

The School of Hygiene Opening Ceremony, Session 1961-62 took place on Fri-

day, September 8. Dr. Basil Layton, M.D., M.P.H., Principal Medical Officer, International Health Department of National Health and Welfare, gave an address entitled "Canada's Role in International Health." This address was followed by a reception.

Federal

John E. Osborne, M.A., Dip. H.A., formerly consultant in hospital administration to the federal hospital insurance administration, has been appointed director of the research and statistics division, Department of National Health and Welfare.

British Columbia

The semi-annual health officers' council met in Victoria September 12, 13 and 14, under the chairmanship of the Deputy Minister of Health, Dr. G. F. Amyot. Among the subjects on the agenda were discussions concerning rehabilitation planning for health unit areas and a presentation by Dr. A. E. Davidson, Deputy Minister of Mental Health Services, on plans for reorganization of mental health services on a regional basis in keeping with the recommendations of the recently published Survey of Mental Health Needs and Resources of British Columbia.

Funds from the hospital construction grant of the National Health Program were allotted recently toward the construction costs of four new community health centers or public health clinics in British Columbia at Duncan, Princeton, Golden and Oak Bay.

Staff Change

Mrs. Lara (Thordarson) Khairat has resigned her position as Supervisor of Health Unit No. 1 of the Metropolitan Health Services of Greater Vancouver. Mrs. Khairat has been associated with the Metropolitan Health Services since 1948, first as a staff nurse, then Mental Health Consultant, Assistant Supervisor and presently, Supervisor.

Alberta

Dr. A. Somerville retired on September 5, 1961 from the position of Deputy Minister of Health which he has held for the last nine years. After serving with the Canadian Army in World War I, he graduated from the University of Manitoba in 1924 and practised for several years at Eckville, Alberta. He obtained his Diploma in Public Health from the University of Toronto in 1932, and during the ensuing five years held a series of appointments with the Health Unit in Red Deer, the Baker Memorial Sanatorium in Calgary and the Provincial Mental Hospital in Ponoka. In 1937 he was appointed as Medical Officer of Health to one of Alberta's oldest rural health units at High River, and in 1942 joined the Provincial Department of Public Health in Edmonton as Director of the Division of Communicable Disease Control. In 1948 he became Assistant Deputy Minister of Health, and was appointed that year to direct a survey of Alberta's health. Finally, in 1952, he succeeded Dr. M. R. Bow as Deputy Minister. Dr. Somerville has served for many years on the Executive Council of the Canadian Public Health Association, and was President of the Association for 1954-55. He

also served, in 1957, as one of Canada's representatives at the World Health Assembly in Geneva.

Dr. Somerville's successor as Deputy Minister is Dr. M. G. McCallum, a graduate of the University of Alberta who obtained his Diploma in Public Health from the University of Toronto in 1942. After serving as Medical Officer of Health with the Health Unit at Stettler, Dr. McCallum joined the Provincial Department of Public Health in 1948 as Director of the Division of Hospital and Medical Services.

Staff Changes

Dr. Agnes E. O'Neil has been appointed as Medical Officer of Health of the newly established Big Country Health Unit at Hanna. Dr. O'Neil, who both graduated and obtained her Diploma in Public Health from the University of Toronto, was formerly an Assistant Medical Officer of Health with the City of Calgary Health Department.

Dr. H. G. W. Bennett, a graduate of the University of Alberta, has been appointed as Dental Officer of the Drumheller Health Unit.

Saskatchewan

As of July 31, 613 farm sewer and water systems have been installed on Saskatchewan farms this year under supervision of the family farm improvement branch, department of agriculture. This number is equal to the total number of systems installed during all of 1960, and it is expected that 700 to 800 more sewer and water systems will be installed on farms during the last half of this construction year.

First in Saskatchewan and understood to be the first of its kind in Canada, a Conference on Employment and Retirement of Older Workers was held in Regina, June 1 and 2. The conference was financially sponsored by five commercial enterprises. It was convened by the Aged and Long-Term Illness Committee established by the Saskatchewan Government. Invitations to the conference were based on one third labour, one third business and industry, and one third government.

Staff Changes

Dr. R. W. Sutherland has joined the Saskatchewan Department of Public Health as medical consultant to the Saskatchewan Hospital Services Plan. Dr. Sutherland enrolled in the hospital administration two-year course at the University of Toronto and received his diploma in hospital administration in 1961.

Miss Dorothy Marion Hopkins, who has served the people of Saskatchewan for 34

years, retired on superannuation from the Department of Public Health on October 4. Miss Hopkins received her certificate in public health nursing from the University of Toronto in 1931.

Health Minister J. Walter Erb, has announced the appointment of Dr. Ian L. W. Clancey as superintendent of the Saskatchewan Hospital, Weyburn. He replaces Dr. Humphry F. Osmond who resigned recently to take up psychiatric work in England. Dr. Clancey has been clinical director at the hospital since 1953.

Manitoba

Health Minister, Honorable George Johnson, and Deputy Minister, Dr. M. R. Elliott, toured the northern area of the Province during August, to see first hand the work being done by Northern Health Services. This unit covers all the territory north of the 53rd parallel, and is under the direction of Dr. P. G. Lommerse.

The laying of the cornerstone of the new six-storey, \$4,300,000 Manitoba Rehabilitation Hospital, was performed by Honorable Duff Roblin, Premier of Manitoba, at a ceremony held August 31.

The new hospital will have 150 in-patient beds, and can handle 200 out-patients a day. The third floor of the hospital will accommodate a school of physiotherapy and occupational therapy.

Ontario

Dr. S. E. Jensen has been appointed Psychiatrist-Director of the new community Mental Health Clinic with the York County Health Unit, Ontario. Dr. Jensen was formerly with the Saskatchewan Psychiatric Services in Weyburn. He is a graduate of the Medical School of Copenhagen, Denmark, and has been in Canada about six years.

New Brunswick

Miss Florence Swan, senior nutritionist with the Maternal and Child Health Division, New Brunswick Department of Health, has been awarded a one-year fellowship for graduate study in the Institute of Nutrition Sciences, School of Public Health and Administrative Medicine, Columbia University, New York. She has been granted a year's leave of absence from the Department.

Nova Scotia

A course in Environmental Hygiene for the Sanitary Inspector was conducted by the Institute of Public Affairs, Dalhousie University in co-operation with the Faculty of Medicine, Dalhousie University, under the auspices of the Departments of Health of Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland, September 11-15, at Dalhousie University.

GEORGE K. KINNEARD, O.B.E., M.D., M.P.H.

Dr. George Kinneard, former Provincial Director of Regional Health Services, died in Moose Jaw, Saskatchewan, on July 16, 1961. Born in Lumsden, Saskatchewan, he graduated in medicine in the University of Manitoba in 1922 and practised at Quill Lake, Saskatchewan, for four years. In 1926 he joined the British Colonial Medical Service, serving in the Leeward Islands, the Bahamas, the Falkland Islands, and the Fiji Islands. For his outstanding service he was awarded

the Order of the British Empire.

In 1945, Dr. Kinneard completed twenty years of service and returned to Saskatchewan being appointed Medical Officer of the Moose Jaw Health Region. In 1951 he was appointed Director of the Regional Health Services Branch of the Provincial Department. He retired in November 1959. Dr. Kinneard was honoured by the Saskatchewan Branch of the Canadian Public Health Association with Honorary Life Membership in 1960.

JOSEPH G. SCHAEFFER, M.A.Sc.

Joseph G. Schaeffer, for 25 years director of the Division of Sanitation, Saskatchewan Department of Public Health, died suddenly, August 9, at the age of 61. A native of St. Paul, Minnesota, he spent his childhood at Humboldt, Saskatchewan, and graduated from Queen's University in 1923 as a civil engineer. He was associated with a number of engineering projects in the

province before entering the public health field, among them the Outlook Bridge and the Broadway Bridge at Saskatoon. He held a number of posts in engineering organizations. In 1948 Mr. Schaeffer organized the Western Canada Water and Sewerage Conference and was its first president. He was chairman of the Saskatchewan Municipal Water Board at the time of his death.

Books and Reports

AGING IN WESTERN SOCIETIES. A Comparative Survey. Edited by Ernest W. Burgess. University of Chicago Press, published in Canada by the University of Toronto Press, Toronto 5, Ont. 1960, 492 pp., \$7.50.

This is the third and last of a series of three volumes presenting the studies in aging by the Gerontological Society Inc. Volume I presented Aging and the Individual, Volume 2, Societal Aspects of Aging. This volume presents a comparative study of the social trends and welfare programs in certain European countries. Part I considers population structure, physical and mental health, and related topics. Part II presents 14 case studies, carefully selected as examples of outstanding European developments. Part III presents statistical tables which give comparative data on socio-economic conditions.

The editor is professor emeritus of sociology and consultant in the Industrial Relations Center, University of Chicago. Dr. Burgess has brought together the contributions of an eminent group of authorities in this volume.

EDUCATION AND PHYSICAL GROWTH. J. M. Tanner. University of London Press, London, England. 1961, 144 pp., 12s. 6d. net.

This book arises out of a series of lectures at the Leeds University Institute of Education in June 1960. Important facts concerning the physical growth of children are discussed. These include, the organization of growth processes, growth gradients, critical periods; stages; and the prediction of adult size from size in childhood. The book also contains a description of the effects on growth of various factors such as nutrition, health, psychological influences, socio-economic class and family size, and the interaction of hereditary and environmental factors in controlling growth. The growth and development of the brain is discussed in some detail in order that the information contained in the rest of the book may be

related to the stages of mental development. The last chapter discusses the implications of the previous chapters for educational policy and practice.

Dr. Tanner is to be congratulated in the way he has presented his material and he provides many of the answers to problems which are of particular significance to those concerned with the education of children.

INHALED PARTICLES AND VAPOURS.

Edited by C. N. Davies. Pergamon Press, Oxford, England. 1961, 495 pp., \$15.

This book represents the Proceedings of an International Symposium organized by the British Occupational Hygiene Society, Oxford, 1960. It is divided into seven sections, namely: Anatomy and physiology; Physical and chemical aspects of particle retention; Radioactive aerosols; Vapours and particle-vapour interactions; Pulmonary elimination and storage of dust; Asbestosis; Selective sampling and pneumoconiosis. The majority of the individual papers are followed by a printed discussion.

The papers discussed in this volume bring together in a way not previously attempted current ideas on the behaviour of the animal lung towards foreign substances in the atmosphere. Fundamental enquiries on the elimination of dust from the terminal air spaces of the lung are in progress by research workers in many different widely scattered countries and in the present symposium their several views are brought together whereby their theories may be integrated. Two new theories on fibrosis are presented, each depending on initiation by organic matter, dead macrophages for silicosis and fragments of the protein sheath of the asbestos body, in asbestosis.

This volume provides an invaluable record of a symposium where many new research results were presented. Industrial physicians and research workers in the fields of biology, physiology, and physics will find much interest in this authoritative work.

